【CLAIMS】

【Claim 1】

An apparatus for estimating a received signal strength indicator (RSSI) of a signal transmitted/received in a wireless network, the apparatus

5   comprising:

an analogue/digital converter (ADC) quantizing one of an I (In-phase)-branch signal and a Q (Quadrature)-branch signal into a digital signal, the I-branch and Q-branch signals being extracted from a signal received through the wireless network;

10   an absolute value calculating unit calculating an absolute value of the digital signal quantized by the ADC and outputting a calculation result;

an accumulate unit accumulating an output of the absolute value calculating unit for a given time period and outputting an accumulated result;

15   a square unit squaring an output of the accumulate unit and outputting a squared result; and

a multiply unit multiplying an output of the square unit by a given value and outputting a multiplied result, the given value being determined based on the number of input bits, an input clip level, and input resistance

20   of the ADC when the probability density functions at input and output signals of the ADC are approximately Gaussian with zero mean.

【Claim 2】

An apparatus for estimating a received signal strength indicator

(RSSI) of a signal transmitted/received in a wireless network, the apparatus comprising:

an analogue/digital converter (ADC) quantizing one of an I (In-phase)-branch signal and a Q (Quadrature)-branch signal into a digital

5   signal, the I-branch and Q-branch signals being extracted from a signal received through the wireless network;

an absolute value calculating unit calculating an absolute value of the digital signal quantized by the ADC and outputting a calculation result;

an accumulate unit accumulating an output of the absolute value

10   calculating unit for a given time period and outputting an accumulated result; and

a computer system estimating an RSSI of the received signal by performing multiplication of an output value of the accumulate unit and a given value, the given value being determined based on the number of

15   input bits, an input clip level, and an input resistance of the ADC when the probability density functions at input and output signals of the ADC are approximately Gaussian with zero mean.

【Claim 3】

The apparatus of claim 1 or claim 2, further comprising a receive

20   antenna receiving a signal through a wireless network and outputting the received signal to the ADC, and

wherein a gain from the receive antenna to the ADC is used when determining the given value.

【Claim 4】

. The apparatus of claim 3, wherein variance of an output signal of the ADC is determined by multiplying variance of an input signal of the ADC and a value (k^2) determined by the number of input bits and an input

5   clip level of the analogue/digital input signal.

【Claim 5】

The apparatus of claim 4, wherein the value (k^2) is determined by the following math figure:

$$k = \frac{2^{B-1}}{V_c}$$

10   where B denotes the number of input bits of the ADC, and Vc denotes an input clip level of the ADC.

【Claim 6】

The apparatus of claim 4, wherein power of the output signal of the ADC is determined based on variance of the output signal of the ADC.

15   【Claim 7】

The apparatus of claim 6, wherein power (E^2) of the output signal of the ADC is determined by the following math figure:

$$E^2 = \frac{2}{\pi}\sigma^2 = 0.6366\sigma^2$$

where σ^2 denotes variance of the output signal of the ADC.

20   【Claim 8】

The apparatus of claim 6, wherein the given value (α) is determined by the following math figure:

$$\alpha = 10^{-\frac{G_{rf}}{10}} \frac{1.2567 \times 10^4 V_c^2}{(2^{2B})RN^2}$$

where B denotes the number of input bits of the ADC, R denotes

5   an input resistance of the ADC, Vc denotes an input clip level of the ADC,

G_{rf} denotes a gain from the receive antenna to the ADC, and N denotes the

number of samples accumulated by the accumulate unit for a given time

period.

[Claim 9]

10   A method for estimating a received signal strength indicator (RSSI)

of a signal transmitted/received through a wireless network, the method

comprising:

a) receiving an accumulated value as an input to estimate an RSSI

of a signal received through a wireless network, the accumulated value

15   being obtained by quantizing one of I-branch and Q-branch signals

extracted from the received signal into a digital signal, taking an absolute

value of the digital signal, and accumulating the absolute value for a given

time period;

b) performing a squaring operation on the accumulated value; and

20   c) estimating an RSSI of the received signal by performing a

multiplication operation between a result of the squaring operation and a

given value, the given value being determined based on the number of

input bits, an input clip level, and an input resistance of the ADC when the

probability density functions at input and output signals of the ADC are

approximately Gaussian with zero mean.

【Claim 10】

5   The method of claim 9, further comprising, before a):

extracting one of I-branch and Q-branch signals from the signal

received through the wireless network and quantizing the extracted signal

into the corresponding digital signal;

calculating an absolute value of the quantized digital signal; and

10   accumulating the absolute value for a given time period and

outputting an accumulated result.

【Claim 11】

The method of claim 9 or claim 10, wherein a gain from a receive

antenna to the ADC is used when determining the given value, the receive

15   antenna receiving a signal through a wireless network and outputting the

signal to the ADC.

【Claim 12】

A method for estimating a received signal strength indicator (RSSI)

of an RSSI estimation apparatus having an analogue/digital converter

20   (ADC) that quantizes a signal into a digital signal, the signal being one of

an I (In-Phase)-branch and Q (Quadrature)-branch signals extracted from a

signal received through a wireless network,

wherein power at an input end of the ADC is determined by using

the RSSI, the power at the input end being calculated using a signal at an

output end of the ADC based on a first relation between variance of an

output signal of the ADC and variance of an input signal of ADC when the

probability density functions at input and output signals of the ADC are

5   approximately Gaussian with zero mean and a second relation between

the power and the variance in the probability density functions as a

Gaussian random variable.

[Claim 13]

The method of claim 12, wherein the first relation is given by the

10   following math figure:

$$\sigma_o^2 = k^2 \sigma_i^2$$

where σ_i^2 denotes variance of the input signal of the ADC, σ_o^2

denotes variance of the output signal of the ADC, and K is given by the

following math figure:

$$k = \frac{2^{B-1}}{V_c}$$

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where B denotes the number of input bits of the ADC, and Vc

denotes an input clip level when an output of the ADC is saturated.

[Claim 14]

The method of claim 12, wherein the second relation is given by the

20   following math figure:

$$E^2 = \frac{2}{\pi}\sigma^2 = 0.6366\sigma^2$$

where E denotes power in a probability density function of a

Gaussian random variable, and σ^2 denotes variance of the probability

density function of the Gaussian random variable.

5   【Claim 15】

The method of one of claims 12 to 14, wherein the RSSI estimation

apparatus further comprises a receive antenna receiving a signal through a

wireless network and outputting the signal to the ADC, wherein

a gain from the receive antenna to the ADC is used when

10   estimating the RSSI.

【Claim 16】

A recording medium storing a program that realizes a method for

estimating a received signal strength indication (RSSI) of a signal received

through a wireless network, the program comprising:

15   a) a function of receiving an accumulated value as an input for

estimating an RSSI of a signal received through a wireless network, the

accumulated value being obtained by quantizing one of I (In-Phase)-branch

and Q (Quadrature)-branch signals extracted from the received signal into

a digital signal, taking an absolute value of the quantized digital signal, and

20   accumulating the absolute value for a given time period;

b) a function performing a squaring operation on the accumulated

value; and

c) a function calculating an RSSI of the received signal by performing a multiplication operation between a result of the squaring operation and a given value, wherein the given value is determined based on the number of input bits, an input clip level, and an input resistance of an

5   analogue/digital converter (ADC) when the probability density functions at input and output signals of the ADC are approximately Gaussian zero mean.

[Claim 17]

A recording medium storing a program the realizes a method for

10   estimating a received signal strength indicator (RSSI) of an RSSI estimation apparatus estimating an RSSI of a signal received through a wireless network, the RSSI estimation apparatus including an analogue/digital converter (ADC) that quantizes one of I (In-Phase)-branch and Q (Quadrature)-branch signals extracted from a signal received

15   through a wireless network,

wherein power at an input end of the ADC using the RSSI, the power at the input end being calculated using a signal at an output end of the ADC based on a first relation between variance of an output signal of the ADC and variance of an input signal of ADC when the probability

20   density functions at input and output signals of the ADC are approximately Gaussian with zero mean and a second relation between the power and the variance in the probability density functions as a Gaussian random variable.